CLAIMS

What is claimed is:

1. A position sensor for sensing position of a diffusely scattering surface comprising:

a source of coherent illumination which illuminates the diffusely scattering surface with first and second input beams angled toward the surface forwardly and rearwardly relative to surface motion;

a fringe detector; and

optics to direct light, scattered from the surface in forward and rearward directions relative to surface motion, to the detector to form a fringe pattern in the plane of the detector, movement of the surface being detected by the fringe detector through movement of the fringe pattern.

2. A position sensor as claimed in claim 1 wherein the detected scattered light is backscattered.

3. A position sensor as claimed in claim 2 wherein the input beams illuminate a common spot of the diffusely scattering surface.

4. A position sensor as claimed in claim 3 wherein the backscattered light is substantially co-linear with the input beams.

5. A position sensor as claimed in claim 3 wherein the backscattered light from respective input beams is isolated by differential polarization of the input beams.

6. A position sensor as claimed in claim 5 wherein a beam of coherent illumination is split into the separate input beams by a polarizing beam splitter, and backscattered light to the detector is filtered by a polarizing beam splitter.

7. A position sensor as claimed in claim 5 wherein separate input beams of coherent illumination of common polarization are directed toward the surface through a polarizing beam splitter, and light from the separate input beams is separated by polarization wave plates.

8. A position sensor as claimed in claim 5 wherein the fringe detector provides sufficient information to define position of a stationary diffusely scattering surface.

9. A position sensor as claimed in claim 5 wherein the fringe detector is a sensor array.

10. A position sensor as claimed in claim 5 wherein the backscattered light is substantially co-linear with the input beams.

11. A position sensor as claimed in claim 1 wherein the fringe detector is a sensor array.

12. A position sensor as claimed in claim 1 wherein the fringe detector provides sufficient information to define position of a stationary diffusely scattering surface.

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13. A position sensor for sensing position of a diffusely scattering surface comprising:

a source of coherent illumination which illuminates a spot of the diffusely scattering surface with separate polarized input beams from forward and reverse directions;

a fringe detector; and

optics to direct light, backscattered from the surface, to form a fringe pattern in the plane of the detector, backscattered light being isolated from specularly reflected light through polarization filters.

14. A position sensor as claimed in claim 13 wherein the fringe detector is an array of sensor elements.

15. A memory read/write arm servo control system comprising:

a source of coherent illumination which illuminates a diffusely scattering surface of the read/write arm with first and second input beams angled toward the surface forwardly and rearwardly relative to surface motion;

a fringe detector;

optics to direct light, backscattered from the surface in forward and rearward directions relative to surface motion, to the detector to form a fringe pattern in the plane of the detector, movement of the surface being detected by the fringe detector through movement of the fringe pattern; and

electronics for controlling drive of a read/write arm drive motor in response to sensed position of the arm.

16. A servo control system as claimed in claim 15 wherein the input beams illuminate a common spot of the diffusely scattering surface.

17. A servo control system as claimed in claim 16 wherein the backscattered light from respective input beams is isolated by polarization of the input beams.

18. A servo control system as claimed in claim 17 wherein the fringe detector is a sensor array.

19. A method of sensing position of a diffusely scattering surface comprising:

illuminating the surface with coherent illumination in first and second input beams angled toward the surface forwardly and rearwardly relative to surface motion;

directing light scattered from the surface in forward and rearward directions relative to surface movement to a fringe detector; and

sensing position of a fringe pattern from the scattered light interfering at the fringe detector as an indication of position of the diffusely reflecting surface.

20. A method as claimed in claim 19 wherein light detected at the fringe detector is backscattered light.

21. A method as claimed in claim 20 wherein the input beams illuminate a common spot of the diffusely scattering surface.

18 ~~22.~~ A method as claimed in claim ~~21~~ 17 wherein the backscattered light is isolated from specularly reflected light by polarization of the input beams.

19 ~~23.~~ A method as claimed in claim ~~22~~ 18 wherein the fringe pattern is detected by a sensor array.

20 ~~24.~~ A method as claimed in claim ~~19~~ 15 wherein the surface is a rotating surface.